A NEW GYMNODAMAEUS FROM WESTERN COLORADO (ACARINA: CRYPTOSTIGMATA, GYMNODAMAEIDAE)[1]

TYLER A. WOOLLEY[2]
Department of Zoology and Entomology, Colorado State University, Fort Collins, Colorado 80521

HAROLD G. HIGGINS[3]
Department of Biology, Granger High School, Granger, Utah 84119

ABSTRACT—A new species of oribatid mites, *Gymnodamaeus* **theliis**, is described, figured, and compared with *G. veriornatus* Higgins, 1961, *G. chalazionus* Woolley, 1972, and *G. leurolomasus* Woolley and Higgins, 1973. The new species is differentiated by a prominant median nipple on the posterior margin of the notogaster. General size categories are indicated for various species of *Gymnodamaeus*. Distribution of the new species includes locations in western Colorado, Washington, and South Dakota. A key to the species of *Gymnodamaeus* of North America is included.

As indicated in other articles (Woolley, 1972; Woolley and Higgins, 1973), the understanding of the complex of species of the genus *Gymnodamaeus* is expanding as the current research is extended and intensified in depth. The number of new species of this genus discovered in North America has doubled since Jacot (1937), Banks (1947), and Hammer (1952) published on them. Comparisons with the species described from Europe, viz. *Gymnodamaeus femoratus* (Koch), Schweitzer, 1922, *G. bicostatus* (C. L. Koch) Sellnick, 1928, *G. austriacus* Willman, 1935, *G. hispanicus* Grandjean, 1928, *G. tunicatus* Balogh, 1958, indicate 2 general size ranges for the species. These size ranges we have categorized provisionally as large and small, with respective average lengths of 550 μ and above for the larger species, 500 μ and below for the smaller ones. These arbitrary limits seem to hold for the 2 categories involved in most observations we have made. The new species described below falls in the category of larger species with *G. veriornatus* Higgins, 1961, *G. chalazionus* Woolley, 1972, and *G. leurolomasus* Woolley and Higgins, 1973.

It is our general opinion and conclusion, as a result of this part of our study, that intensified collecting over extensive areas and periods of time is necessary to disclose the details of a species complex. Initial results indicate that seasonal fluctuations may affect the presence of certain species as well.

[1] Research supported by the Yampa Project; Ecology Consultants, Inc.
[2] Department of Zoology and Entomology, Colorado State University, Fort Collins, Colorado 80521.
[3] Biology Department, Granger High School, Granger, Utah 84119.

The status of such collecting in the science of oribatidology is minimal. All too few of the new species described are part of intensified studies. All too few of the new genera and species named are designated well within the limits of known familial arrangements; if hard to place in familial schemes, neither are they characterized in new families. All too few are compared extensively with other species from the local area or from other states or countries. Intensive studies need to be initiated by all concerned. Adoption of such practices would greatly improve the classification, the identification, and the knowledge of the biology and ecology of oribatids.

Discovery of this new larger species in such disjunct locations as western Colorado, South Dakota, and from the Olympic National Forest in Washington indicates that we need more intensive ecological and more extensive geographic investigations of the oribatids. Until we increase the intensity and extent of the collections, until we increase the numbers of investigators, *per se*, and increase the numbers willing to study in such an intensive manner, we will not understand well the ecology and distribution of oribatids, nor will we be able to determine or systematize their classification as effectively as we otherwise might.

The new species described in this paper is another one taken from the collections near Hayden, Colorado, in our study of the ecology in the environs of a coal-burning power plant.

Gymnodamaeus theliis, Woolley and Higgins, new species
fig. 1–4

Diagnosis: Distinguishing features of this new species are the prominent, median nipple on the posterior margin of the notogaster, the absence of a reticulate pattern on the dorsum compared to *G. veriornatus*, and the absence of teeth on the medial margins of the genital plates, as found in *G. veriornatus* and *G. chalazionus*, but of smaller size than both of these species. The trivial name is derived from the Greek, *thelion*, implying diminutive nipple or teat. The new species is about the same size as *G. leurolomasus*, but larger than *G. plokosus*.

Description: Color dark, reddish brown; prodorsum about as broad as long, rostrum blunt, rostral hairs about as long as lamellar hairs, covered with cerotegument, decurved; lamellar hairs inserted on lateral margins of prodorsum posterior to interrupted, dorsal transverse bar behind rostrum; interlamellar hairs very short, conical, inserted on anteriorly projecting point of curved, sclerotized bars arched anterior to pseudostigmata (fig. 1); a sclerotized, arched, transverse bar anterior to interlamellar hairs; pseudostigmata round, erected above surface of prodorsum; sensillum flattened, clavate, with many barbed flattened flanges on

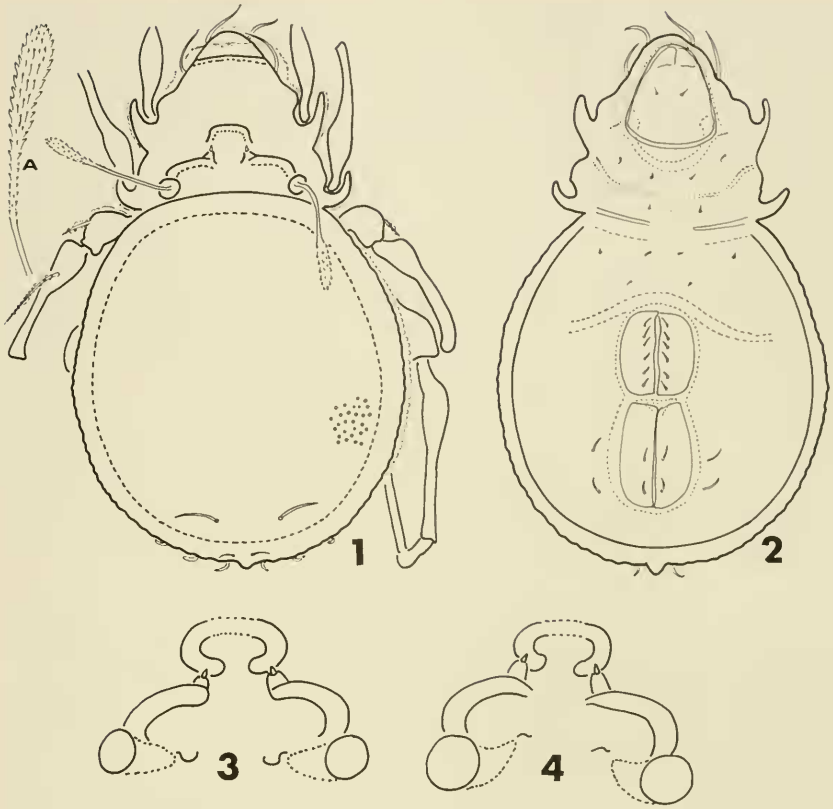

Fig. 1–4, *Gymnodamaeus theliis*. 1, dorsal aspect, legs partially omitted; A, enlarged view of left sensillum. 2, ventral aspect. 3, prodorsal sclerotization of male from Washington, showing variation in configuration of transverse bars. 4, prodorsal sclerotization of female from Washington, showing variation in configuration of transverse bars.

head, pedicel less barbed at base (fig. 1, 1A); cerotegument covering much of prodorsum, extended over sides, on legs, hairs of legs, tectopedia; tectopedia I and II as in Figure 1.

Notogaster slightly more than twice as long as prodorsum, somewhat circular in outline, surface covered with cerotegument and small tubercles; tubercles smaller than those of *G. chalazionus*; notogastral hairs as in figure 1, many obscured by cerotegument; posterior margin of notogaster with prominent median tubercle or nipple, with 3 hairs inserted each side, 2 pairs of hairs anterior to nipple on dorsum, 1 pair simple, short, nearest the nipple; other pair long, covered with cerotegument, inserted about their lengths anterolateral to nipple, as in figure 1; cerotegument over surface of notogaster applied to hairs as well.

Infracapitulum broadly triangular (fig. 2), mental hairs as in figure 2; ventral apodemata and coxisternal setae as in figure 2; apodemata IV typically arched anterior to genital opening, groovelike, with reticulations in groove; genital opening slightly shorter than anal aperture, each genital cover with 6 simple setae, medial margins of covers without teeth; a pre-anal piece anterior to anal covers, each anal cover with 2 setae; adanal setae as in figure 2.

Legs heterotridactylons, median claw much heavier than laterals.

Measurements: For the Colorado specimens, females are generally larger than males, with a range of 702 μ–636 μ × 416 μ–378 μ and an average length of 669 μ, average width of 402 μ. Males ranged in size from 672 μ–612 μ in length, 390 μ–360 μ in width, with average length of 636 μ and width of 378 μ. The 2 male specimens from South Dakota were 630 μ × 372 μ and 596 μ × 330 μ; 1 specimen was of undetermined sex. The specimens taken from Washington ranged from 630 μ to 558 μ in length, 396 μ–342 μ in width for females, 594 μ–528 μ in length, 342 μ–306 μ in width for males; averages were 600 μ length, 358 μ width for females and 568 μ length, 322 μ width for males. Two specimens of those collected measured were not identified as to sex, but their measurements are not included in the above calculations. Measurements of all specimens were taken for length from rostrum to the terminal end of the notogastral nipple and for width at the widest point of the notogaster posterior to legs IV, excluding the cerotegument in both instances. The cerotegument in all specimens was partially loosened and was not a good reference point for measurements of either length or width.

Collections and distribution: The type, a male, and 7 paratype males, 9 paratype females and 1 nymph were collected under aspens, 4 miles south Seneca Road, Hayden, Colorado, 8 June 1971, by T. A. Woolley and H. G. Higgins. Two males, and 1 female (1 specimen with sex undetermined) were collected under oak brush, Wolf Creek North, from a 1968 spoil bank, Hayden, Colorado, 8 June 1971, by T. A. Woolley and H. G. Higgins. Two males and 1 specimen of undetermined sex were taken from the litter, grass under oak and birch, from a picnic ground, E. Legion Lake, Custer State Park, S. D., 27 August 1968 by T. A. Woolley.

Five males, 3 females, 1 specimen of undetermined sex and 1 nymph were collected under hemlock and incense cedar at the site of Old Fort Townsend, Washington, 13 June 1972, by T. O. Thatcher. One female specimen was taken from hemlock limbs, Hoh River, 2 miles west of Olympic Park Boundary, Washington, 13 June 1972, by T. O. Thatcher.

The type and a paratype of each sex from the Colorado collections will be deposited in the U. S. National Museum.

Discussion: Although slightly smaller in size than the specimens from Colorado and South Dakota, the representatives of this new species from Washington have practically identical features. The structure that shows some variation is the sclerotized bar anterior to the interlamellar hairs. In the Washington specimens, this bar is more

heavily sclerotized and has rounded tips near these hairs (fig. 3, 4). We consider these variations to be intraspecific, but not sufficient to erect a subspecies.

It is interesting that this species occurs in locations so widely separated, yet we would almost predict that the species will be found in the intervening areas when collections are intensified and extended. This is the first time in our own experience with oribatids that we have limited the areas of collection and extended collections over some time, but intensified our efforts to collect in certain limited habitats within a general area. We conclude that existing gaps in the geographic distribution of oribatids are only temporary and that these gaps will be closed when more extensive collecting is done.

Key To The North American Species Of *Gymnodamacus*

1. Genital plates with teeth on medial margins 2
— Genital plates without teeth on medial margins 3
2. Dorsum of notogaster with reticulate pattern ..... *verriornatus* Higgins
— Dorsum of notogaster without reticulate pattern, covered with tubercles ..... *chalazionus* Woolley
3. Each genital plate with 7 setae ..... *leurolomasus* Woolley and Higgins
— Each genital plate with 6 setae 4
4. Rostral and lamellar hairs about equal length 6
— Rostral hairs much shorter than lamellar hairs 5
5. Notogaster with 4 posterior nubbins and hairs ..... *plokosus* Woolley and Higgins
— Notogaster without posterior nubbins ..... *pearsei* Banks
6. Dorsum of notogaster with a distinct pattern of oval and crescentic-shaped areas ..... *ornatus* Hammer
— Dorsum without a distinct pattern 7
7. Posterior edge of notogaster with projection or knob 8
— Posterior edge of notogaster smooth and rounded 9
8. Posterior edge of notogaster with 4 small, circular nubbins each bearing a stout hair ..... *quadricaudiculus* Jacot
— Posterior edge of notogaster usually with single, large nipplelike knob, with 3 procumbent hairs each side ..... *theliis* Woolley and Higgins
9. Six notogastral hairs on posterior margin ..... *minor* Banks
— Four notogastral hairs on posterior margin ..... *gildersleeveae* Hammer

References

Balogh, J. 1958. Oribates nouvelles d'Afrique tropicale. Revue de Zool. et de Bot. Africaines. 58(½):1–34.

Banks, N. 1947. On Some Acarina from North Carolina. Psyche. 54(2):110–141.

Grandjean, F. 1928. Deux nouvelle Oribatei d'Espagne. Bull. Soc. Zool. 53(6):424–441.

Hammer, M. 1952. Investigations on Microfauna of Northern Canada. Acta Artica. 4:108 p.

Higgins, H. G. 1961. A new beetle mite from Utah. Great Basin Naturalist. 21(½):27–28.

Jacot, A. P. 1937. Journal of North American Moss Mites. J. N. Y. Entomol. Soc. 45(¾):353–375.
Schweitzer, J. 1922. Beitrag zur Kenntnis der Terrestrichen Milbenfauna der Schweiz. Verhandl. Naturforsch. Gesell. in Basel. 33:23–112.
Sellnick, M. 1928. Formenkreis: Hornmilben, Oribatei, *In* Tierwelt Mitteleuropas, 3(4/9):1–42.
Willmann, C. 1935. Faunitisch-okologische Studien in Anningergebiet, IV, Die Milben Fauna 1, Oribatei. Zool. Jahr. Abt. Syst. Oekol., and Geog. Tiere 66:331–384.
Woolley, T. A. 1972. A new species of *Gymnodamaeus* from Colorado. Great Basin Naturalist. 32(2):97–103.
Woolley, T. A. and H. G. Higgins. 1973. Two new species of *Gymnodamaeus* from Colorado. Great Basin Naturalist. 33(1):37–42.

APHID BIRTHS (HOMOPTERA, APHIDIDAE)

Theodore L. Bissell
University of Maryland, College Park, Maryland 20742

ABSTRACT—Thirteen viviparous births in 6 species of aphids, belonging to the Callaphidini, were observed. The newborn aphids bore on the anal end a round object assumed to be the remnant of the embryonic membrane. The nymph was seen to remove the remnant with its feet in most cases.

In the summer of 1971 observations were made on the bearing of aphids by viviparae of 3 species, indoors and under the microscope. This was under artificial light where the temperature was about 90F.

Aphids seem always to be born feet downward, although embryos in the adult may lie with dorsal or ventral surface, or a side, uppermost. The embryo's head is directed forward and the aphid is born tail-end first, as far as I have observed. Four births were recorded with varying details.

June 28. *Monelliopsis nigropunctata* (Granovsky) from pecan, Glenn Dale, Maryland. Female dropped a nymph, taking 5 minutes from the time the tip of the nymph could first be seen. Nymph motionless until free. On its anal end was a rounded wad about the size of its eye. On hitting the leaf the nymph backed a space of 7 or 8 mm, crossing a leaf vein much higher than itself in the journey, stopped, and kicked free the object on its tail. This took about 2 minutes. Then the nymph apparently began to feed.